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Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 124

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SUB-SAHARAN AFRICA

WEST EUROPE

PAPERS HAIL BANGLADESH-U.S. NUCLEAR AGREEMENT

'BANGLADESH OBSERVER' Editorial

Dacca THE BANGLADESH OBSERVER in English 19 Sep 81 p 5

[Editorial: "Nuclear Energy"]

[Text] Energy is the most important factor in the development process of a country. The same is needed for augmenting the availability of goods and services and advancing the growth of the economy. And the availability of energy from conventional sources is not unbounded. Some of the sources are basically expendable and to that extent less dependable in character. Fossil as a source predominates the scene although it is circumscribed with the risk of being exhausted. Even the renewable sources are in the wane, despite all that is done in the name of preservation and the activities thereof. Presumably the impact of civilization is felt more and more in the form of loss of renewable sources of energy like forestry. This is due to inherent difficulties in the preservation of such sources and the reliance on nature for the continued supply of such sources. In the context of depletion of conventional sources relevant authorities everywhere have looked for alternative sources including atomic energy.

Authorities in Bangladesh have taken into consideration the need for continued supply of energy and the possibility of exploiting non-conventional sources. The realization is based on non-availability of conventional sources, excluding gas and the urgency to look for alternative sources including atomic energy. The adoption of a development project for nuclear power station quite some time back reflects the awareness on the part of the authorities. But the support for such a non-conventional source of energy has been inadequate so far. Despite that the Atomic Energy Commission has done quite a bit of good job and succeeded in putting atomic energy to peaceful use. The inadequacy of research facilities will however be largely met if the atomic research reactor is installed in the new site near the capital. And the signing of an agreement between Bangladesh and the U.S.A. for cooperation in the peaceful uses of nuclear energy will remain a major milestone in this direction.

This agreement will facilitate the exchange of technical equipment, knowledge and expertise for ten years. And the exchange is bound to have sizeable contribution to the overall development of research activities in the country. As it

is, the agreement provides for the supply of research reactor, which will enable the scientists to ensure use of nuclear power for energy, radioisotopes in medicine, agriculture and industry. In addition, disposal of nuclear fuel and exploration and development of nuclear minerals may be facilitated under this agreement. And all this will widen the scope of peaceful uses of atomic energy for ultimate benefit of humanity. In the given context of Bangladesh, where many are found to be outside the ambit of development, the use of nuclear energy for expanding the supply of goods and services will usher in a new era of growth and prosperity.

As it is, the nuclear energy is now under the overall monitoring of the International Atomic Energy Agency. Bangladesh is a signatory to the international treaty of non-proliferation of nuclear weapons, and the entire gamut of activities concerned under the present agreement will be for the peaceful uses of nuclear energy. And Bangladesh needs to use nuclear energy for facilitating production in various sectors. If the entire programme is implemented there is possibility of increasing production of food, controlling health hazards, and generating power which this country needs both for augmenting development and for reducing dependence on expendable but costly source of energy. It is hoped that the agreement will herald yet another phase of peaceful use of atomic energy for a populous country poised for growth.

'BANGLADESH TIMES' Editorial

Dacca THE BANGLADESH TIMES in English 19 Sep 81 p 5

[Editorial: "Nuclear Accord"]

[Text] U.S.-Bangladesh technical and scientific cooperation has added a landmark to it with an 'umbrella' agreement concluded between the two countries for substantive collaboration in peaceful uses of nuclear energy. This positive step has exemplified the resolve of two nations to herald a new era in their bilateral relations harnessing such an instrument to the use of nuclear energy in the service of humanity. The accord, operable within the high international principles as enunciated by the IAEA, is accompanied by a confirmation of an earlier impression given by the U.S. that assistance to Bangladesh will continue without any abatement.

Bangladesh's steadfast commitment to contribute her mite to make the world a place where mankind could live in an atmosphere of peace and economic development is widely known. Similarly familiar must be many countries of the world with our unrelenting and diligent pursuit of economic goals which cannot be translated into realities without rapid breakthroughs made in the fields of agriculture and industry.

The nuclear cooperation accord has a time coverage of ten years which could be extended further, both sides desiring. So, timewise the agreement has a good spread and going by the elements contained in it one gets at the full meaning of the term 'umbrella' given to the instrument.

The vital parts to the agreement have been envisaged in such a way that the entire gamut of peaceful uses of nuclear energy has been encompassed. A new vista for exchanges of technical knowledge and expertise has opened with Bangladesh poised to reaching a forward foothold in substantialising and diversifying the nuclear energy uses attuned to her context and with adequate safeguards against radioactive fallouts. The accessibility to latest information in the field will be of tremendous value to Bangladesh which, as it is, has been a beneficiary of the IAEA support towards developing her nuclear energy. All this will help us consolidate and further the limited advances we have made in the use of radio isotopes. Production and utilisation of this material in medicines, agriculture and industry are covered by the accord with the U.S.A.

The stress given on nuclear power generation is obvious from the measures incorporated to accelerate the establishment of a key research reactor at Savar to be followed by the designing and development of other generation units.

Specially notable is that feature of the accord which concerns exploration and development of nuclear minerals in Bangladesh. Our coastal-belt and the new marine accretions are said to be endowed with them.

CSO: 5100/7010

BRIEFS

SCHOLAR ON ATOM BOMB--Chandigarh, Oct. 10--India need not go in for the manufacture of the atom bomb because its conventional defence forces do not lack credibility vis-a-vis China and Pakistan. The atom bomb will neither add prestige nor extend her area of influence. These are the views of Mr Rakesh Kumar Datta, a research scholar in the department of Defence Studies, Punjabi University, Patiala. He has explained his stand in a paper submitted to an international conference held in London this year. The paper points out that India is rich in atomic minerals and has the world's richest reserve of thorium and a good quantity of uranium. During the comparatively brief period of its functioning, the Bhabha Atomic Research Centre recorded remarkable achievements in various aspects of nuclear technology. She has four research reactors, a plutonium plant and has built several atomic power plants to use nuclear technology for generating electric power and heavy water plants. The country has made considerable progress in delivery systems. The electronic division of the Bhabha Atomic Research Centre is believed to be capable of designing and producing command and control equipment in a limited way. Considerable attention is being paid to missile development though large sums of money are required for research and development. The equatorial rocket launching station has successfully fired some indigenous rockets. [Text] [Calcutta THE SUNDAY STATESMAN in English 11 Oct 81 p 7]

NUCLEAR FUEL COMPLEX--Hyderabad, Oct. 12--The Centre has given clearance to the Nuclear Fuel Complex of the Department of Atomic Energy to procure and install equipment for the production of 2,000 tons of stainless steel tubes with an investment of Rs 13 crores, reports UNI. This was disclosed by the chairman of the Atomic Energy Commission Mr H. N. Sethna, while inaugurating a symposium on "manufacture of seamless ball-bearing steel tubes". at the NFC here today. He said the Government had proposed that the NFC should diversify and take up production of 21,000 tons of ball-bearing seamless steel tubes and 3,000 tons of oil-drill pipes utilizing the surplus capacity of the extrusion plant. Besides fuel, Mr Sethna said, the NFC had been set up for the manufacture of ziracaloy reactor structural components like calandria tubes, collant tubes and guide tubes. He said that the collant tubes required for the Madras reactor had been produced at the NFC using newly-procured equipment. Mr Sethna said that India had "long years of satisfactory performance," of nuclear fuel in the reactors at Tarapur and Rajasthan, which were extremely good by any standards. It had been possible to demonstrate in the NFC plant that nuclear fuel for the reactors at Tarapur, Rajasthan and Madras could be produced. [Text] [Calcutta THE STATESMAN in English 13 Oct 81 p 6]

KASHMIR ZIRCONIUM DISCOVERY--Srinagar, Oct 18 (UNI)--An exotic metal discovered by Kashmir University scientists in the waters of the Dal Lake could reverse the threat of pollution, a scientist has said. Professor Jagdish Shankar, Director of the University's Centre of Research for Development told newsmen here that the metal zirconium, had the property of neutralising phosphates and acted as an anti-pollutant. The metal, which has applications in nuclear reactors, was present in all lakes in the valley, Prof Shankar said, adding that it was carried into the lakes by streams flowing down from the nearby mountains. [New Delhi PATRIOT in English 19 Oct 81 p 4]

CSO: 5100/7013

IAEA CHIEF DENIES STATEMENT ON NUCLEAR SAFETY

Karachi BUSINESS RECORDER in English 3 Nov 81 p 1

[Text] Islamabad, Nov 2: The Director-General of the International Atomic Energy Agency has contradicted reports alleging that he had said "he could no longer vouch for the integrity of the IAEA's nuclear safe-guards" in Pakistan.

"Just as comments based on this false report were unwarranted, the statement about Pakistan trying to develop" the missing link" for nuclear weapons was of the 30-month old propaganda campaign designed to mislead public opinion regarding Pakistan's nuclear programme."

The Karachi plant has been inspected over 40 times by the International Atomic Energy Agency. About a year ago the agency also conducted a complete check of the inventory of fuel bundles. After each inspection the Government of Pakistan received communications expressing satisfaction. Never has any allegation been made of non-compliance by Pakistan with the safeguards agreements it signed with the IAEA.

In a telegram to Washington POST, the IAEA said on October 15 that the Director-General at a meeting of the board of governors on 17th September "referred in general terms to difficulties the IAEA has countered in safeguarding on-load refuelled power reactors" and that "he made no reference to any particular country."

CSO: 5100/504

BRIEFS

URANIUM EXPLORATION AID--The International Atomic Energy Agency has sent two experts to train Thai technicians in the exploration of uranium. The training, which started on 29 October, is attended by 52 officials from the Department of Mineral Resources, the Electricity-Generating Authority of Thailand, the Office of Atomic Energy for Peace and the University of Khon Kaen. It is expected that the training will be of major help in uranium exploration activities in northeastern Thailand. [Bangkok Voice of Free Asia in English 1100 GMT 6 Nov 81 BK]

CSO: 5100/2034

CASTRO MADERO DISCUSSES NUCLEAR PLAN, TLATELOLCO TREATY

Buenos Aires ESTRATEGIA in Spanish No 69 pp 55-61

[Interview with Vice Adm Carlos Castro Madero, by Luis Sartori, on 3 June 1981; place not specified]

[Text] Reporter: Now that over 2 years have elapsed since the official decree which established the Argentine nuclear plan until the end of the century, what is your opinion regarding the progress in the various areas?

Castro Madero: I am quite satisfied with the implementation of the plan approved by Decree 302/79. This assessment is based on the successful negotiation of the contracts required for the construction of Atucha II and the first industrial heavy water plant. In the former, we assumed responsibility for directing the project, and thus we shall give an impetus to the national capacity for designing, installing and assembling nuclear powerplants, and putting them into operation. For this purpose we have set up a mixed engineering enterprise, ENACE [Argentine Nuclear Enterprise for Electric Powerplants], 75 percent of which is owned by CNEA [National Atomic Energy Commission], which will act as the industrial architect of Atucha II and the next nuclear powerplants. The second is a significant gain, because we conquered the resistance against a developing country's having the capacity to produce heavy water, the latter being considered a sensitive area by the London Club, which is an entity including the countries which supply nuclear technology. The construction of both projects has begun, and they are expected to go into operation in 1988 and 1984, respectively. These contracts have been signed without conditions interfering with our sovereignty or limiting our freedom of action. Moreover, mass production of fuel elements has started, a uranium dioxide production plant is being built in Cordoba and there has been total integration of the processes for the production of zircaloy tubes.

Reporter: A recent report disclosed that CNEA is one of the public enterprises with the greatest foreign debt. How is this situation affecting the normal progress of the work? Were the terms of payment used as a means of pressure by the foreign lending entities? If not, is the problem discernible?

C.M.: In principle, a distinction must be made between the long term and short term foreign debt. The former represents a logical, proper and reasonable expedient for financing the projects in the nuclear plan, the most prominent features of which from this standpoint are the large amount of investment and the long construction

period. Hence, this situation facilitates and does not impose conditions on the progress of the work. As for the short-term debt, the amount of it is the result of compliance with the financing structure of the CNEA budget established by the Budget Law. Thus far, with the exception of the increase in administrative work involved in handling that debt, it has not in any way imposed conditions on the progress of the work. The foreign lending entities have not used the terms of payment as an element for pressure. On the contrary, CNEA is of the opinion that, as a result of having managed to establish a competing market in the latest bidding on nuclear powerplants, it was able to demand and procure exceptional terms for the financing of Atucha II (23 years), including a grace period equal to the estimated construction time. Regarding the making of a hypothesis for the future, a diversification is to be expected from international banks, directing their loans toward the expansion of energy sources other than the fossil ones or oil. The overall change in the energy field will increase the demand for funds from the international financing system, and the nuclear sector will participate with a growing percentage in that demand. Those banks, in turn, will have to gear their requirements to the aforementioned features (volume and period) of the nuclear industry. Of course, the features of the international political area will in the end determine the groundrules that will be applied to the nuclear sector and to our country in particular.

Reporter: To what extent do the well-known obstacles imposed by the London Club and, specifically, by the administration of former President Carter, continue to exist, and what are the activities most hurt?

C.M.: The pressure for the country to sign the non-proliferation treaty or to subject its entire nuclear program to safeguards persists, and I don't think that it will decline. We have yet to reach an agreement with IAEA regarding the safeguards that will be applied to Atucha II and the heavy water plant. During the negotiations on those agreements an attempt is being made to include clauses that will entail the application of total safeguards through this indirect expedient. Furthermore, Argentina is encountering increased difficulties in procuring equipment for its programs, and must substitute for this with its own manufactures, of course, at a higher cost and with additional delay. These obstacles confirm to us the need to achieve as soon as possible the greatest degree of autonomy in the mastery of the fuel cycle, so as to avoid being denied, for the sake of non-proliferation, the opportunity to carry out the energy development which the country requires.

Reporter: Do the obstacles posed by Canada, which caused the lag in the construction of the nuclear powerplant at Embalse still persist? Is the termination of that project by the end of 1982 confirmed?

C.M.: The difficulties which arose during the course of this project have been resolved with the passage of time. As in any project of this scope, during its implementation difficulties have arisen which are being surmounted as they occur. Based on the current progress of the project, we estimate that the timetable will be fulfilled as planned, which consists of making the powerplant critical in August 1982, synchronizing the system in September and putting it into full power in November of that year.

Reporter: In connection with the two previous questions, what prospects do you observe after the first visits of envoys from the Reagan government?

C.M.: These first contacts appear to indicate that the Reagan government wishes to improve relations with Argentina in nuclear areas, and to make the United States' nuclear policy as a whole more reasonable, but nevertheless maintaining the basic objective of preventing proliferation. Therefore, a reduction in the non-essential restrictive action for that objective is to be anticipated, such as the "doctrinaire" opposition to all independent action in the nuclear fuel cycle, and the obstacles to exporting components and materials related only peripherally to that cycle. However, it should be recalled that many aspects of the implementation of a change in the United States' nuclear policy will require legislative changes, which entail a considerable time scale. Moreover, when the nuclear policy becomes more reasonable, there will probably be a reduction in the differences between the United States and other countries exporting nuclear technology, which could intensify the approach of potential obstacles to free exchange in this area.

Reporter: It has been learned that those contacts proved the fact that the country to the North will not change its policy in the matter. If this is the case, what is the main difficulty at present, and what position will Argentina assume?

C.M.: Argentina is waiting to see the announced change of policy by the United States in its nuclear relations with Argentina in concrete actions. Nevertheless, because of what has been noted previously, it is likely that the restrictions will continue on the transfer of technology in major areas of the nuclear fuel cycle. Hence, the difficulties cited in response to a previous question, relating to delays, and extra costs and efforts in the implementation of our nuclear program must continue to be taken into account in planning the activities, so as to attain the largest degree of self-sufficiency in the nuclear fuel cycle. In addition to these technological efforts of our own, we must continue to diversify the providers of supplies and technology, and to maintain in all forums a steadfast position in favor of measures that will restore confidence in international nuclear commerce.

Reporter: In June 1980, you stated that the country was preparing to ratify the Treaty of Tlatelolco. What conditions prevailed at that time?

C.M.: My remarks may possibly have been misinterpreted. I have never made such a conclusive assertion, because that decision comes under the jurisdiction of the Ministry of Foreign Relations. What I did say is that the country had begun the process which it deemed unavoidable to carry out, prior to analyzing the feasibility of ratifying the aforementioned treaty. The course of action that was selected consists of prior negotiations with the International Atomic Energy Agency concerning the agreement on safeguards for all its nuclear facilities and activities which is required by Article 13 of the aforementioned international instrument. This step (which the other Latin American countries that signed it took "a posteriori" [after] its ratification) has been deemed unavoidable as a way of insuring that this agreement on safeguards (which, if the Treaty were ratified previously, was to be started and completed in established intervals) does not become a significant obstacle or hindrance to Argentine nuclear technological development for peaceful purposes as a result of the pressure brought to bear on the International Agency by the countries that are supposedly champions of "non-proliferation".

Reporter: What are the reasons for the delay? Could they be associated with local claims to the effect that the Soviet Union and the United States, upon becoming parties to it, will change the essence of the document? Could our country ratify it dispensing with Article 28 thereof?

C.M.: The aforementioned process has continued to date, and has never been interrupted. However, I cannot conceal the fact that major difficulties have cropped up therein. They are due precisely to the pressure imposed on the International Agency that I mentioned before, which has brought about interpretations of the Treaty's clauses that are unacceptable from the Argentine standpoint, because accepting them would interfere with freedom of action in our nuclear development. This holds true for nuclear explosives for peaceful purposes. The United States' adherence to Protocols I and II (although that relating to the former has not yet been ratified), and the USSR's adherence to Protocol II, have facilitated the full force of the Treaty and, consequently, have contributed in theory to making it more acceptable to everyone, including us. However, the interpretative statements made by those countries upon undertaking their respective adherence, which result in the establishment of additional restrictions on the nuclear development of the Latin American nations for peaceful purposes, have contributed to the pressure on the International Atomic Energy Agency with regard to its own interpretation of the clauses of the Treaty of Tlatelolco, in our case creating the difficulties in the negotiations that I mentioned earlier. As I pointed out in my previous response, the ratification of the Treaty of Tlatelolco is contingent on the attainment of a suitable agreement on safeguards with IAEA, and the matter of dispensing with Article 28 is by no means definitive.

Reporter: With regard to the matter of nuclear safeguards, which areas and which types of technology will Argentina not put under that system; in other words, which are the non-negotiable aspects?

C.M.: Argentina maintains that the international exchange of nuclear technology must be covered by suitable safeguards, as a means of promoting the development of nuclear energy for peaceful purposes. On this basis, it has put under safeguards all the nuclear facilities that it has received from abroad, but it refuses to subject to safeguards those facilities which have been developed and built with its own technology, and wherein it has not received any assistance from abroad. This is the only way of actually giving an incentive to external assistance in areas that have been unilaterally defined as sensitive by the London Club. It refuses to give a blank check, such as the signing of total safeguards, which would leave the country without the capacity to negotiate for the procurement of major nuclear technology. In short, safeguards are accepted in exchange for technology.

Reporter: In this regard, has the question about Atucha II been decided?

C.M.: The safeguard requirements relating to the group of contracts which CNEA signed with the firm Kraftwerk Union ir connection with Atucha II have been agreed upon completely between the governments of the Argentine Republic and the Federal Republic of Germany, by means of a mutual exchange of letters, after which the Germany Government (keeping its commitment) issued the respective export permit. As I said before, at the present time Argentina is negotiating the safeguards agreement with the International Atomic Energy Agency, during the discussion of which there has been evidence of pressure from third countries to have the nation indirectly accept terms including its entire future program. I am still optimistic that the aforementioned agreement with IAEA can be signed within a few months.

Reporter: The obstacles that have been noted prompted the CNEA to purchase heavy water from the Soviet Union, and to negotiate for the purchase of enriched uranium

of that origin; an action which is considered in some circles as a retort to the pressure received from the United States. Even if the relations with Washington were to improve, would the purchases from the Eurasian nation continue? Why?

C.M.: For obvious security reasons, our country must diversify its markets supplying strategic technology and materials, so as not to be subjected to dependent subservience in relation to any given country. This is the reason which prompted Argentina to make the aforementioned purchases from the USSR, and the cause that warrants the continuance of such purchases in the future, regardless of how good or bad relations may be with Washington. Argentine is firmly decided to cooperate with any country of the world that wishes to do so with mutual respect and reciprocal benefit, and to resort to any supplier that proves satisfactory in order to insure the attainment of the objectives of its nuclear program.

Reporter: What real likelihood is there that this supply of materials could be contributed by any other nation of the Nuclear Club, or even one with advanced development in technology which is not a member of that exclusive circle, such as Norway?

C.M.: Among the very members of the Nuclear Club, or the London Club as it is usually termed, we have found some who (without violating their commitments to it) have been able to supply us with materials and nuclear technology without supplementary requirements. This holds true for the Federal Republic of Germany, the Swiss Confederation and the USSR itself. Norway does not have heavy water production plants, nor plants to produce enriched uranium.

Reporter: On what level is this type of contact being made, if there are any?

C.M.: These contacts have been on political, technical and commercial levels.

Reporter: On this point, in your opinion will France's atomic policy change now that the Socialist, Mitterrand, has assumed the government? Could the potential changes have an effect on the London Club or on IAEA?

C.M.: At this stage of events, it is still very difficult to predict the effects that the takeover by Mitterrand's Socialist government in France may have on highly diversified areas, including the nuclear one. One can only predict some slowdown in the highly ambitious French nuclear program. One cannot foresee the potential changes having an effect on the International Atomic Energy Agency or on the London Club. In any event, one can assume an even greater adherence by that country, within these agencies, to the principles of the so-called "non-proliferation policy" which, in the long run, would be reflected in obstacles to the transfer of technology and to the trading of nuclear materials; in brief, significant restrictions on nuclear development for the developing countries, as a means of maintaining the nuclear technology monopoly of the developed countries.

Argentine Nuclear Situation

Reporter: What is the actual scope of the agreement on nuclear cooperation signed with Brazil last year? What areas does it include? Is is already in progress?

C.M.: The cooperation with the Federative Republic of Brazil in the nuclear field has been set up through a general agreement on the part of both governments, and a convention for implementation with the National Nuclear Energy Commission of that country, as well as a convention for implementation and a protocol for industrial cooperation with Brazilian Nuclear Corporations (NUCLEBRAS). These conventions and protocols, in turn, have provided a legal framework for the signing (to date) of two protocols with the former (one in the field of nuclear technical information, and another in that of the training of human resources), and three contracts (one an indirect contract through the German firm Kraftwerk Union AG) with the latter. These contracts relate to the loan on the part of this Commission to NUCLEBRAS of 240 tons of uranium concentrate; the supply (also by this Commission) to the Brazilian company of zircaloy tubes for the manufacture of fuel elements for the future Brazilian nuclear powerplants; and the participation of KWU [Kraftwerk Union] and NUCLEBRAS (through its subsidiary, NUCLEP [NUCLEBRAS Heavy Equipment, Inc]) in the manufacture of the lower part of the pressure tank for the Atucha II Nuclear Powerplant. As may be observed, the scope of the cooperation with Brazil is very extensive, and it is fully under way.

Reporter: In this regard, a few days ago President Figueiredo claimed that his country does not need nuclear technological backing from ours. What do you think of that judgment?

C.M.: I am not familiar with the details of the remarks ascribed to President Figueiredo, nor with the context in which the question that evoked them was asked. For this reason, I refrain from expressing an opinion about them.

Reporter: At the nuclear meeting of the nonaligned countries held during 1980 in Buenos Aires, your speech disclosed the intention o' putting Argentina in the forefront of the action in the atomic field. That would afford opportunities for transferring certain technology to non-American countries (as is now being done to Peru, for example). Could this tactic of openness create any friction with Brazil, owing to its hemispheric weight?

C.M.: The developing world constitutes a very broad stage wherein the needs for technical assistance and the possibilities for international cooperation are virtually endless, and obviously far in excess of the capacities of Brazil and Argentina, even combined. Moreover, the relations between the two countries in this area have been marked by mutual respect and sincere cooperation. Hence, one cannot see how the transfer of certain nuclear technology on the part of Argentina to non-American developing countries could create any friction with Brazil.

2909
CSO: 5100/2033

NEW NUCLEAR WASTE STORAGE FACILITIES OPERATING

PY102052 Buenos Aires TELAM in Spanish 1300 GMT 31 Oct 81

[Excerpts] Buenos Aires, 31 Oct (TELAM) -- The National Atomic Energy Commission [CNEA] has increased by 200 percent the spent fuel storage capacity of the Atucha powerplant which will thus be able to continue operating with no obstacles for another 15-year period. For this purpose the plant has adequate facilities for safely storing the irradiated fuel elements.

The CNEA has officially received the building of the second pool house [casa de piletas], which can store 1,000 tons of metal uranium including the shells of 6,900 fuel rods. This storage capacity should be added to the present 440-ton storage facility which is about to be filled up.

The facilities include an operations pool [pileta de maniobras] and a storage room where fuel rods are stored in two layers hanging from stainless steel supports. Loads in the pool house are handled with a traveling crane which can lift 80 tons while irradiated material inside the pools is handled with a gantry crane provided with a carriage and an extendable arm to which gripping devices are attached.

Argentina has no major problems at present regarding the development of its capacity for storing irradiated fuels, but pertinent agencies are already planning security measures similar to those under study in Europe and which will have to be enforced in the year 2,000, when it is certain that substitutes for conventional energy balance does not require the adoption of drastic and complex measures yet, since [words indistinct] electricity has not reached a critical level.

CSO: 5100/2034

BRIEFS

HEAVY WATER PLANT OPERATES ON GAS--Buenos Aires, 4 Nov (TELAM)--It was announced here today that the heavy water plant that the National Atomic Energy Commission [CNEA] is building in Arroyito will operate on gas from the Neuquen basin. The announcement was made on the occasion of the call for bids for the construction of a gas pipeline and a reducer [estacion reductora]. The commission has estimated that the necessary investment will amount to approximately 13.8 billion pesos. This amount will be the base for the bidding that will take place on 3 December 1981 at the commission's headquarters on Libertador Avenue. The fuel gas to be used by the heavy water plant will be conveyed by a 16-km-long gas pipeline made up of 8-inch diameter pipes from the rich Neuquen Province basin whose reserves have been estimated at 314 billion cubic meters. The commission has decided to establish a 7-month building period starting from the date of the signature of the contract. It foresees an approximate daily gas consumption of 800,000 cubic meters. CNEA's decision to make use of the gas at a place that is close to its natural sources has been regarded as an important step aimed at reducing the cost of the Arroyito industrial plant. [PY092356 Buenos Aires TELAM in Spanish 1545 GMT 4 Nov 81]

CSO: 5100/2034

NUCLEAR ENGINEERING PROFESSOR VIEWS TRAINING, JOB MARKET

Rio de Janeiro O GLOBO in Portuguese 23 Oct 81 Supplement p 1

[Text] Expansion of the job market for nuclear-related occupations depends upon acceleration of the National Nuclear Energy Policy and the timetable of the Brazil-FRG Nuclear Agreement, according to Luiz Fernando Seixas de Oliveira, professor in the Nuclear Engineering program at Rio de Janeiro Federal University [UFRJ].

At present the market is in balance because nearly all technicians trained since 1976 (when the National Nuclear Energy Policy was instituted) have been employed in building the Angra dos Reis power plants. With the stretch-out of the construction timetable, however, the government limited scholarships to what a stagnant labor market could absorb.

"It cannot be said that there is unemployment in the sector. There was a great deal of training during the last 5 years, but that is now limited by the government, which each year grants fewer scholarships to universities with accredited courses in the nuclear area. All these graduates are now employed. But because of the stretched-out timetable young professionals who are still in training may face unemployment."

According to Luiz Fernando, only the government could help expand the labor market for professionals in the nuclear area. In his opinion, this could be done by returning to the timetable originally established in the Brazil-FRG agreement, which in 1976 provided for construction of nine reactors by 1990.

"The government," Luiz Fernando said, "within the initial concept of the agreement had planned that nine nuclear reactors would be operating in Brazil by 1990. This deadline has been extended to 1995 and so far only the Angra I plant is anywhere near operation."

Luiz Fernando thinks the agreement should not have been made in the way that was planned "because Brazil cannot afford even to begin a project of this sort." The delays in construction timetables are, according to him, proof that this warning should have been heeded.

In the professor's opinion, before planning the power plants greater emphasis should have been given to training the personnel needed to put them in operation. According to Luiz Fernando, small nuclear projects should have been carried out in order to "develop genuine domestic competence on a larger scale.

"On that basis the government could then have gone on to larger projects, in keeping with rigorous planning that could forecast not only costs but also manpower utilization," he said.

Other experts in the sector note that if the nuclear program were on schedule it would have to be slowed down due to lack of qualified personnel in Brazil. Luiz Fernando says the only reason Brazil is not feeling the effects of this manpower shortage is that the timetable for building the reactors is far behind schedule.

"If the program continues as it is now," he said, "there will be no manpower shortage, even though the trained professionals are already in the market and the number in training is constantly decreasing because of the scholarship limitation. But what Brazil really lacks is very high-level specialists with vast experience in the field to operate the major agencies dealing with nuclear activities. For this purpose we are still importing even technicians."

According to Presidential Decree No 77,977, which instituted the Human Resources Program for the nuclear sector (PRONUCLEAR [Brazilian Nuclear Program]), there were to be 4,335 higher-level and 5,580 intermediate-level professionals, for a total of 9,915, to be trained in the 1976-85 period. Among the higher-level professionals there were to be 3,690 engineers (civil, mechanical, electrical, electronic, metallurgical, chemical and mining), 150 geologists, 300 physicists and 195 graduates in other areas.

According to Joaquim Francisco de Carvalho, director of NUCLEN [Nuclebras Engineering, Inc] (a subsidiary of Nuclebras) from 1966 to 1969 [sic; 1976 to 1979?], "the problem of training manpower for nuclear energy in Brazil will not be solved through building nuclear power plants." The problem, he says, should be viewed in an all-embracing manner, beginning with elementary education.

"After all," he said, "what is a specialist in nuclear energy? Is it the neutron physicist? Or is it the metallurgist, the mechanical engineer or the instrumentation and control specialist? All of these and even a chemist could be converted into excellent nuclear engineers, provided that they have had good academic training and experience acquired through professional work in industry."

This last aspect is what is lacking, according to Joaquim de Carvalho, who cites "a chronic deficiency"--in qualitative and quantitative terms--in intermediate vocational training and a "great qualitative deficiency in training higher-level engineers in the areas of mechanics, metallurgy, chemistry and instrumentation and control." These should be the courses taken by engineers who want to enter the nuclear field, according to Joaquim Carvalho.

"Good engineers trained in these specialties can work in a variety of fields in industry and in the energy sector, such as production and utilization of biomass fuels or thermoelectric generation from coal or hydroelectric generation."

The former NUCLEN director believes that, working in these sectors "closely associated with Brazil's natural-resource endowment," such professionals could "reimburse to society in a short time what was invested in their professional training.

"Later, then, when it really became necessary," he said, "mechanical, metallurgical, electrical, instrumentation and control and even chemical engineers could be trained for the nuclear field with a small additional investment."

This, he says, is how it was done in rich countries such as Germany, France and the United States. He said he could not see why a country as poor as Brazil should invest money beyond its means to train nuclear engineers on a large scale when, as a matter of fact, we do not yet need such engineers, since we can generate in hydroelectric plants all the electricity we need until at least the second decade of the next century.

In the opinion of Joaquim Carvalho, a nuclear engineer is nothing more than a mechanical or metallurgical or chemical or electronic instrumentation and control engineer who has acquired precise understanding of industrial problems and who has practical experience in quality assurance and control programs.

Moreover, he emphasized that Brazil must train these same professionals to develop techniques for producing and utilizing biomass fuels (generation of coal in conventional standards). He explains why:

"I should like to recall that if we were to use only 2 percent of the national territory for decentralized biomass production in 'agro-energy' districts distributed throughout the federation, we could have in such districts a combined production of fuel (alcohol, charcoal, biogas, and so forth) with an energy potential equivalent to about one-third of Saudi Arabia's petroleum production. This would probably go a long way toward making Brazil a rich country and with good income distribution, because biomass is, by definition, labor intensive."

Joaquim Carvalho also spoke about the activities of the chemist, physicist and geologist in the field of nuclear energy. The chemist works directly in control of radioactive material and in production of nuclear fuel, from processing the ore to conversion, enrichment and reprocessing.

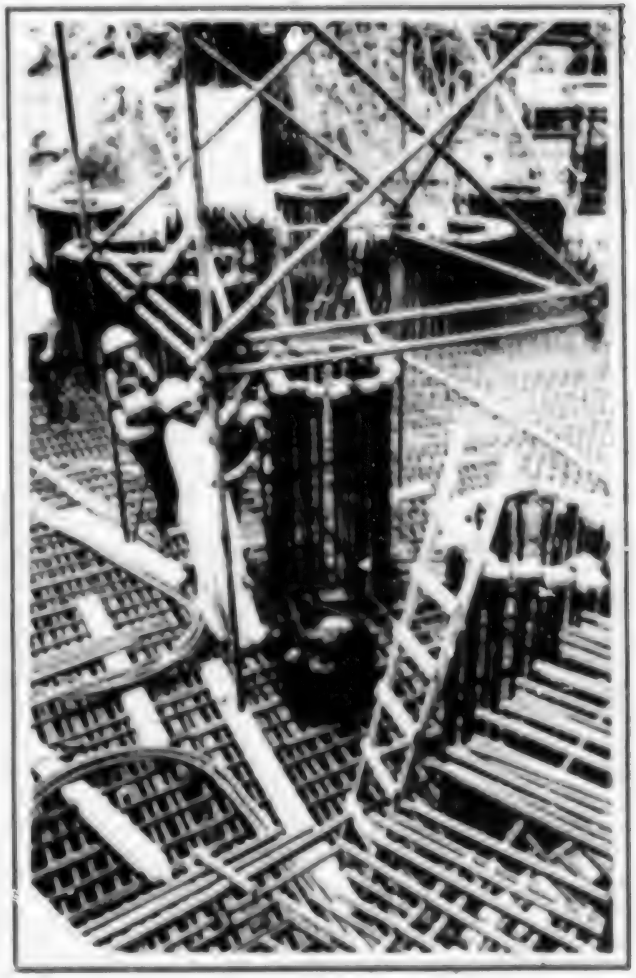
The physicist is devoted more to research and conducting studies related to computations for nuclear reactors, nuclear fuel and control of radiation. The geologist works in exploring and processing nuclear material.

The major employer is, essentially, the government, through Nuclebras and its subsidiaries. In Rio de Janeiro, other employers are the Nuclear Engineering Institute, of the National Nuclear Energy Commission; Furnas Electric Power Corporation; Radio-Production [sic; Radio-Protection?] and Dosimetry Institute; and the universities. All offer a nuclear engineer a starting salary of about 140,000 cruzeiros.

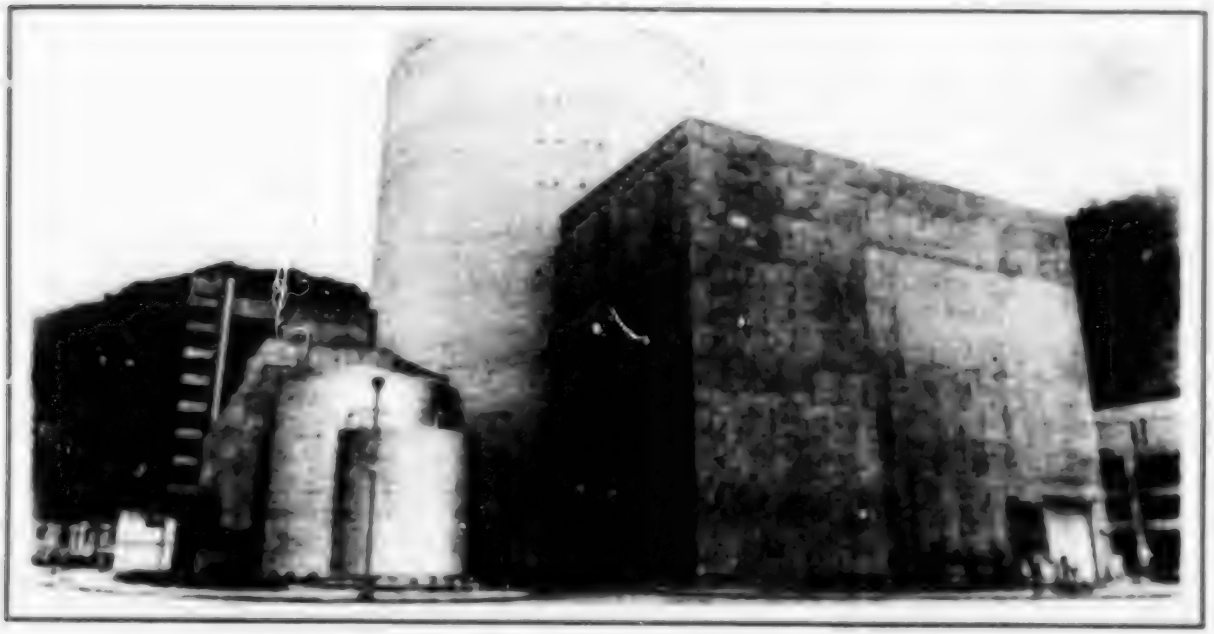
In Brazil there are not yet any undergraduate courses in the nuclear area. At this level in Brazil there are "nuclear option" courses, offered by about 15 institutions located in various parts of the country. The nuclear option is an offering, during the last 2 years of engineering study, of some elective courses such as nuclear physics, atomic physics, nuclear engineering and radio-protection.

The nuclear option is offered in Brazil at the federal universities of Santa Maria, Rio Grande do Sul [UFRS], Santa Catarina [UFSC], Parana, Sao Carlos, Rio de Janeiro,

Authorities and Minister Cesar Cals
in the center of the Angra I reactor



Workers prepare the concrete base
for the Angra II reactor



The Angra I nuclear reactor is in the biggest building,
where it is in the testing stage

The room where the whole process of generating energy at Angra I is controlled

Pernambuco and Paraiba [UFPB]; the universities of Sao Paulo [USP] and Brasilia [UNB]; the Technical Aeronautics Institute [ITA]; the Atomic Energy Institute; the Military Engineering Institute [IME]; the Pontifical Catholic University of Rio de Janeiro [PUC/RJ]; and the Itajuba Federal School of Engineering.

At the graduate level, master's-degree programs in the nuclear area are given in the Atomic Energy Institute, the Coordination of Postgraduate Programs in Engineering (COPPE) of the UFRJ, the Military Engineering Institute and the federal universities of Minas Gerais and Pernambuco.

At the master's-degree level there is also the "nuclear cap," which consists of some institutions offering some specific courses, within the normal graduate course in engineering.

There are "nuclear cap" graduate courses within civil engineering (offered by COPPE, PUC/RJ and UFRS); mechanical engineering (PUC/RJ, ITA and UFSC); electrical engineering (UFSC, USP, UFPB and ITA); chemical engineering (COPPE); metallurgy and materials (COPPE, IME, UFRS and USP); "micrometereologia" [micrometeorology?] (National Space Research Institute); and geology (UNB and UFPA [Federal University of Para]).

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NUCLEBRAS DETAILS PARTICULARS OF CEARA NUCLEAR COMPLEX

Rio de Janeiro JORNAL DO BRASIL in Portuguese 2 Nov 81 p 12

[Text] Brasilia--Nuclebras, with the staff of Mines and Energy Minister Cesar Cals, is working out details of the integrated nuclear complex the minister wants to construct in Ceara, sources associated with his office revealed.

Wednesday Ambassador Paulo Nogueira Batista, Nuclebras president, met with the mines and energy minister to work out details of the complex. At the same time the company's superintendent, Col Sebastiao Valadao, was meeting with the minister's staff to get the project started in the right direction.

Plants

According to the ministerial source, the idea is to construct a nuclear complex whose feasibility is closely related to developing the phosphate associated with the uranium ore. PETROFERTIL [Petrobras Fertilizers, Inc] will be responsible for processing the phosphate rock, the raw material for phosphate fertilizers.

The complex, according to plans being studied, will be composed of the following stages: a) mining; b) separation of the phosphate; c) concentration of the uranium (production of yellow cake); d) conversion of uranium oxide into uranium hexafluoride; e) enrichment; f) reconversion of enriched uranium hexafluoride into uranium oxide, the form in which it will be exported.

The mines and energy minister's staff source also said the matter of providing electric power for the complex is being worked out with ELETROBRAS [Brazilian Electric Power Companies, Inc]. Three alternatives are being studied: construction of a 1,300-megawatt nuclear unit; construction of two 650-megawatt units; or even, should demand warrant, two 1,300-megawatt units.

The Mines and Energy Ministry and Nuclebras hope that everything will be planned so that Brazil can have enriched uranium available for export as of 1990 or 1991, as a big demand for the product in the international market is expected from that time on.

For furnishing electric power, an extensive study is being made that includes construction of hydroelectric plants on the Sao Francisco River and in the Araguaia-Tocantins Basin.

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NUCLEN, CSN READY CIVIL DEFENSE PLAN FOR ANGRA DOS REIS

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 11 Nov 81 p 15

[Text] Brasilia--In case of accident at the Angra dos Reis nuclear power plants, the government has nearly completed and is keeping under strict secrecy a plan for defense of the endangered population that is being coordinated by NUCLEN [Nuclebras Engineering, Inc] and the National Security Council. The Special Secretariat for Civil Defense (SEDEC) of the Interior Ministry, the three military ministries and the Rio de Janeiro Civil Police and Fire Department are also participating.

The fact that the plan is now in its final stage was confirmed yesterday in Brasilia by Gen Anibal Gurgel do Amaral, moments before the opening ceremony of the Second National Civil Defense Symposium.

In his speech he announced that his ministry is concluding studies relative to creating the National Civil Defense System which, among other responsibilities, is to "provide the general public with suitable information about undertakings in the nuclear field."

However, some technicians who are helping plan the Angra dos Reis project--organization of a civil defense strategy is one of the requirements for licensing the plant--do not understand how the operational plan can be kept secret, as it will, in extreme cases, be used to mobilize the stricken population. In reference to the civil defense plan, General Anibal said--without explaining whether or not it was being done--that "a campaign will be conducted to inform the public about how nuclear plants operate." According to the general, "the public need not worry, because the probability of a serious accident is 1 in 100 million," adding that "even though it is practically impossible, we have prepared a civil defense plan." Anibal also believes that the refineries in the city are more dangerous to the population of Rio de Janeiro than are the Angra dos Reis power plants.

Another agency of the Interior Ministry that studied the subject and prepared a plan in addition to the one by SEDEC is the Special Secretariat for the Environment, which made a study about permanent evaluation of radioactive contamination in the Angra dos Reis area at a distance of more than 15 kilometers from the power plant. Monitoring radiation within that 15-kilometer radius is the exclusive responsibility of CNEN [National Nuclear Energy Commission].

The national civil defense system is intended mainly to strengthen the sector through a better organization of SEDEC, which operates a fund--the National Public Calamity Fund--that this year had an appropriation of only 90 million cruzeiros. This would not be enough money for SEDEC to meet its responsibilities planned by the system to be established, such as effectively coordinating the preventive, care and recovery measures necessary in an emergency situation, as well as establishing standards for transporting dangerous products and controlling the flow of such material.

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BRIEFS

ENRICHED URANIUM CONTRACT CONFIRMED--The South African Electricity Supply Commission has confirmed that a contract has been concluded for the supply of enriched uranium for the nuclear power station at Koeberg near Cape Town. A spokesman confirmed a report that the French consortium Framatome, the main contractor at Koeberg, would be obtaining the uranium, although the exact source of the material was not revealed. Earlier this year there were reports that the Koeberg project was being jeopardized by American refusal to supply enriched uranium to South Africa unless this country became a party to the nuclear nonproliferation treaty. The new development means that the Koeberg station is proceeding according to plan and should be on stream by the end of 1982. [Text] [LD131726 Johannesburg International Service in English 1500 GMT 13 Nov 81]

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UK TO JOIN FIVE OTHER COUNTRIES IN URANIUM PROSPECTING

Lusaka DAILY MAIL in English 5 Nov 81 pp 1, 4

[Excerpt] Britain has become the latest state to join other countries which have shown interest in prospecting for uranium in Zambia.

Permanent Secretary for Mines Mr Julian Masaninga said in Lusaka yesterday that the Ministry had been approached by Britain with interest to start prospecting for the strategic mineral.

Britain's desire to explore for uranium in Zambia is in addition to Power Research and Nuclear Fuel Development Company of Japan and, Romania, which have also shown interest.

Three companies, Saarberg Interplan of West Germany and Agip SPA of Italy in confunction with Cogema of France are already prospecting for uranium in various parts of the country where a lot of potential of the mineral had been discovered.

Uranium is a strategic mineral used in the production of atomic energy and is also used in the production of atomic bombs.

Mr Masaninga said negotiations between the government and Britain would start paving the way for an agreement "as soon as they are ready."

That there were so many countries showing so much interest in prospecting for the mineral was an indication of the potential for the minerals' presen. e in the country, he said.

Mr Masaninga said mining of the uranium could not start at the moment because of the amount of groundwork to be done, by the companies prospecting for the mineral before going into full scale mining.

During the recent visit to Europe with Minister of Mines, Mr Mufaya Mumbuna, many rounds of talks were held with some of the companies based in the countries visited and involved in prospecting for uranium in Zambia, he said.

"While in West Germany, we had discussions with Saarberg Interplan to find out what problems they are facing and how we can assist them," Mr Masaninga said.

He said all the companies so far had only prospecting licences before embarking on mining of the mineral.

Mr Masaninga said he has had talks with Saarberg Interplan on the need for the company to expand their administrative offices here and embark on the training of local personnel in the field of uranium prospecting.

He said, the company had responded favourably in this direction and hoped that an agreement would soon be signed.

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PAPER FINDS COUNTRY LAGS BEHIND SWEDEN IN NUCLEAR WASTE DISPOSAL

Helsinki HELSINGIN SANOMAT in Finnish 18 Oct 81 p 2

[Editorial: "Must Prepare Now for Nuclear Waste"]

[Text] Finland is at present one of the leading countries in the use of nuclear power. As nuclear power has also been able to maintain its competitiveness with other forms of energy, our country has done well from the economic point of view.

We are faced with one worry, however: Finland is not among the leading countries in the study of problems related to the use of nuclear power. For example, we lag far behind Sweden. Sweden's proportion of nuclear power use is equal to ours, but Sweden uses noticeably more money for the study of nuclear waste management and disposal than the Finnish power industry does.

Although it can be said that Sweden should bear greater moral responsibility of waste disposal research since it constructs nuclear power plants, the Finns do not have the right to stay behind and expect others to come up with ready answers to these problems. As long as nuclear waste is being produced in Finland, the responsibility for nuclear pollution belongs to Finns as well, not only to the suppliers of nuclear power plants.

The committee on nuclear energy law postulates that the producers of nuclear waste must be responsible for disposal as well as for the expense involved. With this principle in mind, the committee proposes that nuclear power companies must prepare themselves for nuclear waste disposal already now by stowing away funds for this purpose.

The committee estimates that the nuclear power companies should have about Fmk 3 billion savings by the time the first reactors have burned out. The yearly expense for the companies would be quite steep, but at the moment it is the only preparatory measure possible.

Insufficient attention has been paid so far to the closing of the nuclear plants. The radioactive content of the unloading waste is as high as that of the so-called nuclear power plant waste, which stays dangerous for hundreds of years. The demands of this task are manifested clearly by for example the fact that the discarded pressure chamber of a nuclear reactor takes 1500 years to become harmless. We will have the first one of these in our hands as early as after 30 years. For this reason, we must not linger in starting to collect funds for this purpose.

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